

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY



(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 16 DEC 2005

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Applicant's or agent's file reference BP110692		FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/FI2004/000730		International filing date (day/month/year) 02.12.2004		Priority date (day/month/year) 03.12.2003
International Patent Classification (IPC) or national classification and IPC C08B11/00, C08B11/12				
Applicant KEMIRA OYJ et al.				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand 29.09.2005		Date of completion of this report 16.12.2005		
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Lensen, H Telephone No. +31 70 340-2428 		

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/FI2004/000730

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-16 as originally filed

Claims, Numbers

1-16 as originally filed

Drawings, Sheets

1/1 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-18
	No: Claims	
Inventive step (IS)	Yes: Claims	5-7
	No: Claims	1-4, 8-18
Industrial applicability (IA)	Yes: Claims	1-18
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1). Reference is made to the following documents:

D1 : CN-A-1417407

= D1A WPI/Derwent 2003-578476 [55]

D2 : US-A-2002/00566633

D3 : WPI/Derwent 2000-130535 [12] & JP-A-2000001501

The document D3 was not cited in the international search report.

A copy of the document is appended hereto.

2). Art. 33(2) PCT (Novelty) :

The document D1 discloses a process for the preparation of cellulose derivatives by dissolving cellulose first in a specific ionic liquid.

However it is not unambiguously clear from D1A if D1 discloses the whole process for preparing cellulose ethers as defined in claim 1 and the subject-matter of the main claim therefore appears to be novel.

3). Art. 33(3) PCT

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 appears not to involve an inventive step in the sense of Article 33(3) PCT.

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1.

The subject-matter of claim 1 therefore differs from this known method in that a cellulose ether is prepared in three steps,

1) a dissolution step in an ionic liquid, 2) the treatment with an etherifying agent and 3) the separation of the cellulose ether from the solution.

The problem to be solved by the present invention may therefore be regarded as to provide a new method for producing a cellulose ether without any unnecessary excess of the inorganic base such as NaOH and no solubility problems of the reagents and the product formed.

The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

Homogeneous cellulose derivatizations, such as esterification or etherifications in solvents have been widely reported. This suggestion is made in the article of the same authors of D1 in the journal " Biomacromolecules, 2004, Volume 5, pages 266-268" and in particular on page 266, column on the left, first paragraph. This document deals in same way as in D1 with the homogeneous acetylation of cellulose in a ionic liquid. The reaction is described as possessing several obvious advantages, such as catalyst-free, rapid, DS value controllable, and solvent recyclable.

Moreover the suggestion of the etherification of cellulose using the ionic liquid is also made (see page 268, column on the right, second paragraph).

In claim 1 of the present application, the ionic liquid as disclosed in D1 is not excluded.

In D1A it is explicitly mentioned that the ionic liquid dissolves the cellulose.

D2 discloses the chemical transformation such as an etherification reaction in microwave-assisted reactions, using ionic liquids as solvent. Less catalytic agent is needed, less breakdown of the reaction product and a minimal amount of side-products are formed (see column 3, paragraph [0036] and [0039].

Moreover a process for the etherification of cellulose in a short reaction time, with a high degree of substitution and a minimal amount of alkali and without the use of organic bases is disclosed in D3.

The steps of treatment with the etherifying agent and the separation of the cellulose ether from the solution are for the skilled person routine experimental works without any inventive skill.

The skilled person would easily find an incentive in D2 and D3 to try to make cellulose derivatives such as cellulose ethers and in combination with the whole technical teaching of D1 come to the process of claim 1.

4). Dependent claims 2-4, 8-18 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, see documents D1 and D2 and the corresponding passages cited in the search report.

5). The subject-matter of claims 5-7 is novel and involves an inventive step since the skilled person finds no hint in the available prior art to select the ionic liquids as specified in

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(SEPARATE SHEET)**

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said claims in order to prepare the cellulose ethers.

6). Art. 33(4) PCT :

The subject-matter of the claims is considered to be industrially applicable.